

## New Test To Identify Screwworm Larvae

The same technology that brought pregnancy test kits home is now being used to help identify larvae of the screwworm, *Cochliomyia hominivorax*, in the field. The test can differentiate them from those of a related screwworm, *C. macellaria*, which is not harmful to cattle.

A new test developed by ARS scientists at the Midwest Livestock Insects Research Laboratory in Lincoln, Nebraska, makes quick work of a complex identification process to distinguish screwworm larvae from close relatives in the fly family.

The test is expected to be used at airport terminals and other ports of entry to identify suspicious insects found on dogs, horses, and other animals which can carry screwworm larvae. Currently, specimens must be viewed in a lab under microscopes by trained entomologists.

Called an ELISA, for enzyme-linked immunosorbant assay, the test will make it easier for scientists and agricultural officials in developing countries to identify and track screwworm infestations and accidental re-introductions and to positively identify laboratory populations quickly and easily.

Little or no training is required to use the kit. Just crush a suspect larva in a small container and add a few drops of the kit's enzyme. If the sample turns a distinctive blue color, the larva was a screwworm.

"This test is important because the screwworm larva and its close relatives can be easily confused in the primary larval stages," says ARS entomologist Steve R. Skoda. "This test allows anyone to make a positive identification so steps can be taken to prevent an accidental infestation."

Before its eradication in the 1970s, screwworm was one of the most serious insect pests of the domestic livestock industry. It devastated livestock populations across the southern United States and in Mexico, costing cattle producers hundreds of millions of dollars each year.

The adult female lays her eggs in living tissue, and the larvae hatch and feed on the wound, creating an opportunity for bacterial infections. Other females lay more eggs in the infected wounds and continue the cycle. Many screwworm-infested animals die.

The screwworm has been eradicated from the United States, Mexico, and part of Central America to Nicaragua. It still persists in Costa Rica and Panama.—By **Dawn Lyons-Johnson, ARS.**

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## Cytokine Protein Helps Cows Fight Mastitis

Mastitis, an infection of the mammary gland, affects more than half of all U.S. dairy cows and costs the dairy industry more than \$180 per cow annually.

Marcus E. Kehrli, Jr., an ARS veterinary medical officer at the National Animal Disease Center at Ames, Iowa, has discovered that giving cows a natural compound helps them ward off mastitis. The cows already make this protein—cytokine G-CSF—in skin and other body cells. It stimulates bone marrow to produce white blood cells that help the immune system fight infections.

In recent studies, Kehrli injected cows with the compound daily from days 3 through 7 after calving. On the 6th day, the cows were challenged with a bacterium, and their response was monitored for several more days.

The good news is that one-half of the cows receiving G-CSF did not become infected when challenged with the bacteria. The other half of the G-CSF-injected cows had shorter and less severe infections than cows in the control group. All of the control group cows became infected and developed mastitis.

"Besides protecting a good number of cows, we were able to reduce the severity of infections by using this compound," Kehrli says. Cows receiving G-CSF had good appetites and gave more milk than those not receiving it. The benefit of using G-CSF as a preventative: less use of antibiotics in cows to treat mastitis.

Over the past decade, Kehrli and A.E. Freeman, an Iowa State University (ISU) professor of animal science, have been developing a way to identify the genetic source of resistance to mastitis. So far, they have identified a few cows that are naturally more resistant to mastitis infections.

The ARS and ISU researchers are currently collaborating with 21st Century Genetics-CRI, a bull stud company in Shawano, Wisconsin. As a result of this collaboration, producers may someday be able to purchase cows that have been bred for mastitis resistance.—By **Linda Cooke McGraw, ARS.**

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